REMARKS

Applicants have inserted a reference to the parent application of the present continuation-in-part application, after the title of the invention, as requested by the Examiner. Applicants have also amended the "ABSTRACT OF THE DISCLOSURE" to remove phrases which may be implied, as requested by the Examiner.

Claim Rejections Under 35 U.S.C. § 112:

Claims 6 - 9, 25, 26, 44, 45, and 53 - 55 are rejected under 35 U.S.C. § 112, second paragraph as being indefinite on grounds that these claims contain the trademark/trade name HASTELLOY® or ELGILOY®. While applicants' attorney can understand concern about the use of a trademark to reference a composition, where the composition may change with time while the trademark does not change, there are instances in which a material is described in the literature in general using a name which is related to a trademark but which is also defined in industry specifications as representing a specific composition. For example, with respect to HASTELLOY® C-22, and ELGILOY®, the specific compositions and properties of these alloys are known, are published in the literature, and are provided in applicants' Specification at Page 26. Referring to these alloys as they are specifically referred to in the industry and as they are defined in the application Specification does not make claims which refer to these alloys indefinite. In the present instance, Claims 7, 9, 25, 27, 45, and 53 - 55 are not indefinite, since the definition of each material recited is present in applicants' Specification at Page 26. References to trademark-related names in the claims have been removed in instances where a definition of the named material is not provided in applicants' Specification.

Claim 26, which is rejected for referring to a trademark/trade name does not contain either, according to applicants' records; the Examiner may have meant Claim 27, but Claim 27 is not indefinite, since the alloy referred to is defined in applicants' Specification, as discussed above.

Applicants have amended the claims so that the claims recite only alloys which are defined in applicants' Specification. Since the name used for reference in the claims is one having a definite, defined composition and properties, the Examiner is respectfully requested to withdraw the rejection of Claims 6 - 9, 25, 26, 44, 45, and 53 - 55 under 35 U.S.C. § 112, second paragraph as being indefinite on grounds that these claims contain a trademark/trade name.

Claim Rejections Under 35 U.S.C. § 102:

Claims 1 - 3, 12 - 22, 29 - 32, 35, 36, 42, and 47 - 51 are rejected under 35 U.S.C. § 102(b) as being anticipated by Morel et al. (U.S. 5,094,268).

Applicants contend that the Morel et al. disclosure does not anticipate applicants' invention, because the Morel et al. disclosure does not enable applicants' invention as currently claimed.

To have anticipation under 35 U.S.C. § 102(b), a prior art disclosure must also be enabling, such that one of ordinary skill in the art could practice the invention without undue experimentation. *SmithKline Beecham* , 403 F.3d 1331, 1342, 74 U.S.P.Q.2D (BNA)1396, (Fed. Cir. 2005). The disclosure in an assertedly anticipating reference must be adequate to enable possession of the desired subject matter. It is insufficient to name or describe the desired subject matter, if it cannot be produced without undue experimentation. *Elan PharmaceuticalsInc. v. Mayo foundation for Medical Education and Research*, 346 F.3d1051, 68 U.S.P.Q. 2d 1373,1376 (Fed. Cir. 2003). In the present instance, the Examiner cites Morel et al. as anticipating the present invention because of the following cited passage: At Col. 3, lines 13 - 17 "The connection plate 3 may be made, for example from superimposed metal sheets into which the passages 4 have been machined, for example by electroerosion of electrochemical machining, the sheets then being diffusion welded together to form the plate 3." However, the Morel et al. reference does not claim a diffusion bonded structure and does not describe or claim a diffusion bonding process for diffusion bonding of superimposed "metal sheets". The composition of the

"metal sheets" is not even mentioned. The only discussion of diffusion bonding in the Morel et al. reference is the 5 lines cited above, and this is not enabling for diffusion bonding of any structure. The description fails to call out the composition of the metal sheets, and fails to call out the conditions under which the diffusion bonding may occur. As can be observed from applicants' Specification, at Page 6, Paragraph [0020] through [0022]; Page 7, Paragraph [0026]; Page 9, Paragraph [0031]; Pages 19 - 21, Paragraphs [0079] - [0081] including Table One; Pages 25 - 33, Paragraphs [0093] - [0114], including Table Two, diffusion bonding is a very complicated process.

To achieve adequate bonding of layers so that fluids are contained and directed as desired without leaking between diffusion bonded layers, a number of different factors must be considered, where the factors are based on the starting material used as layers in the diffusion bonding process. For example, and not by way of limitation, the surface roughness of the material must meet particular requirements, contaminants on the material surface typically need to be removed by a cleaning process, and the composition of the material at its surface (as distinguished from the overall composition of the material) may need to be temporarily adjusted to enable bonding. The processing conditions required to achieve adequate diffusion bonding depend on the composition of the material, as indicated in applicants' tables. Applicants have claimed diffusion-bonded fluid handling structures which are fabricated from particular materials and have enabled the fabrication for these materials. The detailed description provided was necessary to ensure that one skilled in the art would be successful at diffusion bonding. The Morel et al. disclosure might motivate one skilled in the art to try to diffusion bond some unspecified material, but an extensive amount of work would be required to actually achieve proper diffusion bonding. A large amount of experimentation would be required. The case law cited above clearly supports applicants' contention that the disclosure in the Morel et al. reference does not anticipate applicants' invention because the Morel et al. disclosure does not enable applicants' invention.

In view of the inadequate disclosure to enable applicants' invention in the Morel et al. reference, the Examiner is respectfully requested to withdraw the rejection of Claims 1 - 3, 12 - 22, 29 - 32, 35, 36, 42, and 47 - 51 under 35 U.S.C. § 102(b) as being anticipated by Morel et al. (U.S. 5,094,268).

Claim Rejections Under 35 U.S.C. § 103:

Claims 4 - 9, 23 - 27, and 43 - 45 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Morel et al. (U.S. Patent 5,094,268).

The Examiner comments that the Morel et al. reference does not specifically disclose that the metal layers of the manifold 40 are made of stainless steel or a corrosion-resistant alloy, but argues that it would have been obvious to one of skill in the art at the time the invention was made to use such materials. As applicants argued above, there is no enablement in the Morel et al. reference for diffusion bonding of any particular materials. Further, it is a well-established precedent in patent law that "obvious to try" is not the standard for obviousness under 35 U.S.C. § 103. "The mere need for experimentation to determine parameters needed to make a device work is an application of the often rejected obvious-to-try standard and falls short of the statutory obviousness of 35 U.S.C. §103." (*Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).) "An 'obvious-to-try' situation exists when a general disclosure may pique the scientist's curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result or indicate that the claimed result would be obtained if certain directions were pursued." (*In re Eli Lilly & Co.*, 902 F.2d 943, 14 U.S.P.Q. 2d 1741 (Fed.Cir. 1990).)

Applicants contend that the corrosion-resistant alloys of the kind they described in their application Specification and in their exemplary embodiments each require specific surface treatments and processing conditions in order to provide diffusion bonding of the kind described and claimed. The diffusion bonding methods taught by applicants provide adherence of the

individual layers to each other adequate to form a fluid handling structure. This means there cannot be leakage along the horizontal surfaces of the mating layers in the structure. After diffusion bonding, the only spaces available for fluid flow must be the conduits which are formed within the diffusion bonded layer by the etched design of the individual layers. The bonded structure must be equivalent to a single block of metal with conduits machined into it. This latter structure is well known, but is particularly costly and difficult to machine. While it may have been obvious to try to diffusion bond a stack of etched through layers, it is not obvious how adequate diffusion bonding can be achieved from the disclosure in the Morel et al. reference. The Morel et al. reference does not provide even a hint as to how the diffusion bonding is achieved. All that is provided is a bald statement that the layers are diffusion bonded, without even an explanation as to what the composition of the layers is. It took applicants more than 20 pages of description to provide one skilled in the art with a reasonable certainty that fluid handling devices of the kind described by applicants could be fabricated from the kinds of materials described by applicants using diffusion bonding techniques. Diffusion bonding is a complicated process, as is illustrated by applicants' disclosure, and the Morel et al. reference does not render applicants' disclosure and claims obvious. One reading the Morel et al. reference would not know where to begin with respect to a diffusion bonding process.

The Examiner has not made a prima facie case of obviousness, and the Examiner is respectfully requested to withdraw the rejection of Claims 4 - 9, 23 - 27, and 43 - 45 under 35 U.S.C. § 103 (a) as being unpatentable over Morel et al. (U.S. Patent 5,094,268).

Claims 10, 11, 28, and 46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Morel et al. (U.S. 5,094,268).

Applicants contend that their invention as claimed in Claims 10, 11, 28, and 46 is not obvious over the Morel et al. reference. The Examiner comments that the Morel et al. reference does not specifically disclose the thickness of the metal layer which is used, but that it would be

obvious to one of ordinary skill in the art to select a thickness of metal layer which would best fit a particular plate design, and to optimize performance. The thickness which might best fit a particular plate design might not be able to be diffusion bonded. For example, applicants explain at Page 35, lines 12 - 13, Paragraph [0119], "In some instances several layers of a given pattern may be used to arrive at a particular thickness". It would be less expensive just to use one layer of the pattern for purposes of obtaining the design, but several layers have to be used because a single layer of the thickness needed cannot be diffusion bonded within the overall structure which is being diffusion bonded. In applicants' Summary of Invention at Page 8, lines 5 - 10, Paragraph [0026], applicants disclose that the metal layers of corrosion-resistant alloys which are used in the invention may range in thickness from about 0.0005 inch to about 0.06 inch.

The issue here is not one of optimization, when no underlying disclosure is provided. The issue is whether the structure can be fabricated at all using diffusion bonding. Once applicants provide their disclosure, then one of skill in the art can build on that disclosure to optimize both the diffusion bonded structure and the method of diffusion bonding. Prior to applicants' disclosure, there is nothing to optimize. The Morel et al. disclosure has provided only a concept that diffusion bonding may be used to form a structure, with no hint of how one skilled in the art should begin. This is simply a suggestion to experiment with the hope that a working diffusion bonded structure can be achieved. There are many instances when one skilled in the art knows that he/she would like to accomplish a particular goal based on a design. However, wanting to accomplish the goal is different from knowing how or being able to accomplish the goal.

The Examiner has not provided a prima facie case of obviousness, and the Examiner is respectfully requested to withdraw the rejection of Claims 10, 11, 28, and 46 under 35 U.S.C. § 103(a) as being unpatentable over Morel et al. (U.S. 5,094,268).

Claims 52 - 55 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Morel et al. (U.S. 5,094,268). Claims 52 - 55 are method claims which pertain to fabrication of a gas distribution assembly for use in semiconductor processing equipment. A plurality of metal layers are chemically or electrochemically etched through, where the etched through locations are aligned to provide a feature, and then the aligned layers are diffusion bonded to provide the gas distribution assembly. The plurality of metal layers include a metal selected from the group consisting of a stainless steel, a corrosion-resistant nickel-comprising alloy, a corrosion-resistant cobalt-comprising alloy, and combinations thereof. Claims 52 - 55 recite particular processing temperatures and pressures in combination with time periods for varying alloys.

The Examiner comments that although the Morel et al. reference does not specifically disclose the process conditions for diffusion bonding, it would have been obvious to one skilled in the art to use conditions based on the design of the structure, to optimize performance of the structure.

Again, there is no discussion of diffusion bonding methods in the Morel et al. reference. If the Examiner has a reference which describes specific diffusion bonding conditions which can be used for the kinds of materials at layer thicknesses which are described by applicants, the Examiner should cite such a reference. The Morel et al. reference does not provide even a hint of where to start with respect to a diffusion bonding technique which can be used to fabricate the kind of semiconductor manufacturing devices described by applicants. Based on the Morel et al. reference disclosure, a very large amount of experimentation would be required, with no reasonable certainty that an adequate bonded structure could be obtained.

The Examiner has not made a prima facie case of obviousness, and the Examiner is respectfully requested to withdraw the rejection of Claims 52 - 55 under 35 U.S.C. § 103(a) as being unpatentable over Morel et al. (U.S. 5,094,268).

Claims 33 and 34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Morel et al. (U.S. 5,094,268) in view of Fenwick et al. (U.S. 4,570,675).

Claims 33 and 34 pertain to a fluid distribution network architecture for use in semiconductor processing equipment, where the network architecture comprises a fluid handling structure including a plurality of metal layers (selected from the group consisting of a stainless steel, a corrosion-resistant nickel-comprising alloy, a corrosion-resistant cobalt-comprising alloy, and combinations thereof) which have been diffusion bonded to include at least one feature which has been chemically or electrochemically etched through prior to the diffusion bonding. In particular, the structure includes a component device which is partially or fully integrated into and is simultaneously diffusion bonded with the plurality of metal layers (Claim 33). The component device is selected from the group consisting of manually operated valves, automatic valves, combination manually operated/automatic valves, pressure and temperature sensors, pressure regulators, flow sensing devices, flow controllers, laminal flow devices, check valves, filters, and purifiers (Claim 34). The Examiner comments that although the Morel et al. reference does not disclose that a component device is bonded during the bonding of the plurality of metal layers, diffusion bonding is known in the art for attaching or welding the components together. The Fenwick et al reference is cited as teaching a component integrally formed by diffusion bonding or welding.

The inadequacies of the Morel et al. reference with respect to disclosure of the present invention are discussed in detail above. Clearly there is not even a suggestion in the Morel et al. reference that an integrated component device is simultaneously formed during diffusion bonding of the structural device. The Morel et al. connection plate which is suggested for diffusion bonding is shown as a block like structure with fluid channels present in the block-like structure. The electrohydraulic or electropneumatic elements 2 which are shown in Figures 1 and 2, for example, are not integral to a proposed diffusion-bonded connection plate, but are merely mounted on top of the plate.

The Fenwick et al. invention relates to electrical signal multiplexers. (Col. 1. line 4). The Examiner refers to a component 604A which is diffusion bonded to the top layer of a stack of metal layers. At Col. 8, lines 4 - 16, the Fenwick et al reference teaches that the ring 601 is preferably a stack of separate rings 601 A - Y and that a 25 layer stack would provide the required dimension. At Col. 8, lines 18 - 20, the Fenwick et al. reference teaches that four support brackets 604 A - D, which are shown in Figure 9 as being part of a single layer of material (which is also in the form of a ring) are attached by diffusion bonding to the surface of the layer which is the top layer in the 25-layer stack of ringed layers. Figure 9 and accompanying description at Col. 8, lines 1 - 40 illustrates that the bracket devices are present as part of a layer prior to bonding of the layer to the surface of ring 601. This is distinctly different from applicants' invention where a series of layers which have been electrochemically etched through at various positions are bonded together to form a component simultaneously with the diffusion bonding of surrounding fluid distribution network architecture.

A quick review of Figure 9 shows that the support brackets 604 A - D are present as a part of a single layer of material which is subsequently diffusion bonded to the surface of an underlying layer. The support brackets are not formed by a diffusion bonding process.

The Fenwick et al. reference teaches the diffusion bonding of two layers of material (one of which contains support brackets). The Morel et al. reference which shows a connection plate having fluid flow conduits present inside the plate only suggests that the plate may be fabricated from superimposed metal sheets which are diffusion bonded. A combination of these references does not teach or suggest applicants' invention as claimed in Claims 33 and 34. One skilled in the art looking at this combination of disclosures might conclude, for example, that the electrohydraulic or electropneumatic elements 2 of Morel et al might be able to be diffusion bonded to the upper surface of the connection plate 3. (Although this is probably not desirable from a maintenance standpoint.) And, since the Fenwick et al. reference clearly states that the ring 601 is preferably comprised of a stack of separate rings, these rings would not be diffusion

bonded together. A combination of these references does not lead one skilled in the art toward applicants' invention as claimed in Claims 33 and 34, where a series of layers which have been electrochemically etched through at various positions are bonded together to form an component which is integrated into a fluid distribution network architecture, where the component is formed by diffusion bonding simultaneously with the diffusion bonding of surrounding fluid distribution network architecture.

The Examiner has failed to provide a showing of prima facie obviousness for applicants' invention as claimed in Claims 33 and 34. The Examiner is respectfully requested to withdraw the rejection of Claims 33 and 34 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Morel et al. (U.S. 5,094,268) in view of Fenwick et al. (U.S. 4,570,675).

Applicants contend that the presently pending claims as amended are in condition for allowance, and the Examiner is respectfully requested to enter the present amendment and to pass the application to allowance.

The Examiner is invited to contact applicants' attorney with any questions or suggestions about amendment of the claims. The telephone number of applicants' attorney is provided below.

Respectfully submitted,

Shirley L. Church

Shirley L. Church
Registration No. 31,858
Attorney for Applicants
(619) 231-3666 Ext. 181

Correspondence Address:
Patent Counsel
Applied Materials, Inc.
P.O. Box 450-A
Santa Clara, CA 95052